

ABSTRACT OF THE DISCLOSURE

An optical brancher 110 branches an input optical signal into two. An optical detector 120 converts one optical signal branched by the optical brancher 110 into an electrical signal.

5 A first controller 122 generates a control electrical signal having a waveform obtained by inverting the envelope of the electrical signal. Based on the control electrical signal, an optical signal generator 124 produces a dummy optical signal having a waveform  $\lambda d$  and an amplitude  $\alpha/2$ . The other signal  
10 branched by the optical brancher 110 is delayed by a delay unit 112 for a predetermined time, and then multiplexed by an optical multiplexer 114 with the dummy optical signal from the optical signal generator 124. An optical amplifier 116 amplifies a multiplexed optical signal. An optical filter 118 separates an  
15 optical signal of a wavelength  $\lambda 1$  from the amplified optical signal. Thus, optical signal amplification can be carried out without optical surges.